

Modifiability of modern dentistry with aloe vera

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Abstract

Aloe vera is one of the oldest plants mentioned in the ancient records as a medicinal source for over 4000 years. Aloe vera belongs to the “Asphodelaceae” (liliaceae) family. The anti-inflammatory agents present in aloe vera can help in reducing inflammation and pain. Aloe vera keeps the body healthy with essential nutrients including

proteins, vitamins, minerals, essential fatty acids, fiber and water. In the context of the varied benefits and medicinal advantages of aloe vera including the analgesic, anti-inflammatory, antiseptic, antibacterial, antifungal, antiviral, antioxidant and immune-modulating properties of aloe vera, the present review gives an overview of the

facts how aloe vera can help in the field of modern dentistry.

Keywords: Aloe Vera, Modern Dentistry, Therapeutics

Introduction

Aloe vera is one of the oldest plants mentioned in the ancient records as a medicinal source for over 4000 years. Aloe vera belongs to the “Asphodelaceae” (liliaceae) family.¹ It has got over 400 species and the most common and useful among all in the species is aloe vera *barbadensis*. The name aloe vera is derived from two different words “Alloeh” that means “shining bitter substance” in Arabic and “Vera” from Latin meaning “true”.¹ Aloe vera has been the subject of many scientific studies over the last few years regarding several claimed therapeutic properties. Aloe vera has various names according to sources such as ‘the wand of Heaven’, ‘Heaven Blessing’ and ‘The Silent Healer’. The ancient Chinese, Egyptian, Greek and Native Americans have all used aloe vera as part of their traditional medicine. In the Bible, it is mentioned that aloe vera was wrapped around the body of Jesus Christ when he was removed from the cross. Alexander, the great, conquered the island of Socotra with aloe vera plantation when he got to know that aloe vera had medicinal properties which can help in healing the wound of his soldiers.¹ With this evidence, we get to know about the therapeutic properties of aloe vera. The Egyptian tsarinas Cleopatra and Nefertiti who were famous for their beauty and smooth skin took bath in a combination of aloe vera and milk. According to a study, aloe vera leaf consists of phytochemicals bioactivity as aloe vera contains 75 active substances including vitamins, enzymes, minerals, sugars, amino acids, salicylic acids and anthraquinones. It is, also, claimed that aloe vera contains 8 potential enzymes including alkaline phosphatase, amylase, bradykinase, carboxypeptidase, catalase, cellulose, peroxidase and lipase which help in

reducing inflammation when applied topically. It, also, has vitamins such as vitamin A, C, E, B12 and folic acid and minerals like calcium, magnesium, chromium, copper, selenium, manganese, potassium, sodium and zinc. Aloe vera, also, is rich in glucose and fructose monosaccharides and glucomannans polysaccharides. The hormones like auxins and gibberellins present in aloe vera help in wound healing. Recently, a glycoprotein named alprogen with anti-allergic properties and a compound, C-glucosylchromone, with distinguished anti-inflammatory properties, have been extracted from aloe vera gel. Aloe vera is loaded with potent antioxidants that can help fight serious diseases. The anti-inflammatory agents present in aloe vera can help in reducing inflammation and pain. Aloe vera keeps the body healthy with essential nutrients including proteins, vitamins, minerals, essential fatty acids, fiber and water.² In the context of the varied benefits and medicinal advantages of aloe vera including the analgesic, anti-inflammatory, antiseptic, antibacterial, antifungal, antiviral, antioxidant and immune-modulating properties of aloe vera, the present review gives an overview of the facts how aloe vera can help in the field of modern dentistry.

Discussion

Aloe vera has varied uses in the treatment of a plethora of oro-dental conditions. Its antiviral properties help in the treatment of Herpes Simplex and Herpes Zoster infections. A randomized controlled trial conducted by Choonhakarn et al³ to check the efficacy of aloe vera gel in the treatment of oral lichen planus found aloe vera to be more effective than placebo in inducing clinical and symptomatological improvement in oral lichen planus. Also, aloe vera has been found to be better in results as compared to the conventional steroid therapy for oral lesions as against triamcinolone with added advantage of no significant side effects of using aloe vera than the

conventional drugs. Another double-blind clinical trial conducted by Babae et al⁴ concluded that 2% oral aloe vera gel is not only effective in reducing patient's pain scores and wound size but was, also, found to be effective in decreasing the wound healing period in patients with minor aphthous stomatitis. Acemannan hydrogel present in aloe vera is reasoned-out to accelerate the healing and also, reduce the pain associated with aphthous stomatitis. Aloe vera is, also, helpful in the treatment of another significant oral potentially malignant epithelial lesion (PMEL) named oral submucous fibrosis (OSMF) wherein it gives a symptomatic relief in reducing the burning sensation and enhances mouth opening. Studies have, also, reported the beneficial uses of aloe vera gel and mouthwash in reducing symptoms of radiation-induced mucositis. Also, aloe vera is hypothesized to have potential advantage in treating oral candidiasis in patients undergoing radiotherapy because of its anti-fungal properties.

A study conducted by Ahmadi A⁵ to evaluate the anti-inflammatory properties of aloe vera mouthwash on plaque-induced gingivitis suggested a statistically significant reduction of gingival inflammation in all the three groups, however, there was more reduction in the aloe vera mouthwash and scaling group. The anti-inflammatory and wound healing properties of aloe vera were studied by Davis et al⁶, as well, who substantiated that this property of aloe vera is due to the presence of growth substance, mannose-6 phosphate, in it. So, it can be used as an adjunct to mechanical therapy for treating plaque-induced gingivitis. The clinical effects of subgingival application of aloe vera gel in periodontal pockets of adult periodontitis patients after mechanical debridement were evaluated by Bhat et al⁷. In this study, 15 subjects were evaluated for clinical parameters such as plaque index, gingival index, probing pocket depth at

baseline followed by scaling and root planning wherein the results exhibited encouraging findings in improvement of the said clinical parameters concluding aloe vera to be a potential drug for local delivery and that subgingival administration of aloe vera gel results in improvement of periodontal condition.¹ Aloe vera can be used as a mouth wash in periodontitis patients as an effective antiplaque agent which is not only affordable but with lesser side effects than as compared to the gold standard chlorhexidine.⁸ Additionally, it can be directly applied in sites of periodontal surgeries with periodontal dressing.⁹ Aloe vera is, also, hypothesized to increase collagen formation in such cases which is a an added factor to support healing.

Another significant use of aloe vera is seen in the treatment of patients with denture stomatitis wherein the patients can benefit from aloe vera because of its potent antimicrobial and anti-inflammatory properties.¹⁰ Aloe vera gel is found as a good adhesive as well since it contains acemannan as the main ingredient which is sticky and viscous in nature and can potentially serve as an effective herbal substitute for commercial denture adhesive.^{9,11} Aloe vera is, also, found to be effective in controlling inflammation from bacterial contamination around dental implants serving to be of significant clinical advantage in patients with implantitis as well.¹⁰ The antimicrobial and anti-inflammatory properties of aloe vera can help in the reduction of inflammation in various inflammatory conditions pertaining to oro-dental conditions.¹²

The antibacterial effect of aloe vera (as it contains anthraquinones) can be used in root canal treatment as well with aloe vera gel being effective in the decontamination of gutta percha cones.¹³ In a study conducted by Kriplani et al¹⁴, the antimicrobial effectiveness of aloe vera against 18 strains of bacteria

isolated from infected root canals of primary molar teeth using agar diffusion assay was evaluated while it was concluded that aloe vera+sterile water was found to have superior antimicrobial activity against most of the microorganisms followed by ZOE+aloe vera, calcium hydroxide+aloe vera, ZOE alone, calcium hydroxide alone and Metapex in the descending order with vaseline showing no inhibition.

The potent antimicrobial and anti-inflammatory properties of aloe vera have, also, been associated with its anti-cariogenic properties when used as a dentifrice wherein aloe vera containing dentifrices have shown inhibition of growth of organisms such as *S. viscosus*, *S. mutans*, *S. sanguis*. Also, dentifrices with aloe vera have fewer abrasives and can be used in patients with sensitive teeth. Shende and Telrandhe¹⁵ concluded that natural remedies are more acceptable, safer and have minimum side effects than synthetic preparations. Aloe vera tooth gels are not only capable of maintaining the oral hygiene but are, also, useful in reducing the antimicrobial activity in the oral cavity.

Nimma et al¹⁶, also, concluded from their study that aloe vera is a safe, natural and user-friendly alternative adjunct that might be feasible to promote healing of extraction sockets. The components of aloe vera are versatile compounds with potent antimicrobial and anti-inflammatory properties that can be harnessed for wound healing and regulating pain and inflammation in extraction sockets. During healing, aloe vera produces new collagen by stimulating fibroblasts and is more effective than macrophages which have an indirect effect as compared to aloe vera in the healing of extraction sockets. As aloe vera increases collagen production, therefore, collagen bond is responsible for providing tensile strength. Aloe vera, also, contains growth factors that bind to the fibroblast insulin-like growth factor (IGF) receptors in the wound area and

subsequently, produce collagen and proteoglycans which result in increased tensile strength of the wound. Aloe vera, also, has shown benefits in treating alveolar osteitis as compared to patients treated with clindamycin alone.

Contraindications and cautions with the use of aloe vera: With such potential uses which are still to be known and harnessed, the wonder drug of aloe vera, still, has some contraindications if someone has an allergy to plants belonging to the "Asphodelaceae" (liliaceae) family. Oral aloe vera is, also, not recommended during pregnancy and in breast feeding mothers due to effects which are yet to be researched. Aloe vera may cause redness and burning sensation in patients who are susceptible while anthraquinones present in aloe vera is mostly responsible for the allergic reactions seen.¹⁷

Conclusions

Aloe vera truly is a miracle plant with a vast number of uses in dentistry which are well-documented. Also, much of the clinical applications of aloe vera in dentistry are yet to be recognized which mandates further clinical research in this regard so that the whole mankind can be benefitted from its wide range of properties and applications.

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